

CLAIMS:

1. Information carrier containing a non-clonable optical identifier (2) comprising:
 - an optical scattering medium (3) for being challenged by a light beam (5) and for scattering said light beam (5), and
 - a light absorbing means (3, 4) for reducing the intensity of said light beam (5)5 so that an integration time for obtaining a response signal by integrating the light beam scattered (8) is extended.
2. Information carrier as claimed in claim 1, characterized in that said light absorbing means comprises a gray filter (4) attached to said optical scattering medium (3).
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3. Information carrier as claimed in claim 1, characterized in that said light absorbing means comprises a phase change layer, which darkens permanently when the intensity of said light beam (5) is above a threshold intensity.
- 15 4. Information carrier as claimed in claim 1, characterized in that said light absorbing means comprises a photo layer, which darkens temporarily when the intensity of said light beam (5) is above a threshold intensity.
5. Information carrier as claimed in claim 1, characterized in that said light
20 absorbing means comprises a photo layer which darkens permanently when exposed to light.
6. Information carrier as claimed in claim 1, characterized in that said scattering medium (3) and said light absorbing means are integral.
- 25 7. Information carrier as claimed in claim 6, characterized in that said light absorbing means are implemented by using a scattering material having a low light transmittance or reflectance, containing scattering particles of phase-change material or photo-effect material.

8. Information carrier as claimed in claim 1, characterized in that said non-clonable optical identifier further comprises a light modulator (16) on the side of the information carrier for facing said light beam (5).

5 9. Information carrier as claimed in claim 8, characterized in that said light modulator (16) has a switching time larger than 1 ms.

10. Reading apparatus for reading an information carrier (1) containing a non-clonable optical identifier (2) comprising an optical scattering medium (3) for being
10 challenged by a light beam (5) and for scattering said light beam (5), and a light absorbing means (3, 4) for reducing the intensity of said light beam (5) so that an integration time for obtaining a response signal by integrating the light beam scattered (8) is extended, said reading apparatus comprising:

- a light source (13) for emitting a light beam (5) for challenging the optical
15 identifier (2) of said information carrier (1),
- a detector (6) for detecting scattered light (8) scattered by the scattering medium (3) of said information carrier (1) and for integrating said scattered light (8) over a period of time for obtaining a response signal to be used for comparing to a stored response signal associated with a corresponding challenge signal.

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11. Reading apparatus as claimed in claim 10, further comprising:

- a storage means (14) for storing challenge signals and associated response
signals for said identifier (2), and
- a comparison means (15) for comparing the obtained response signal with the
25 stored response signal associated with a corresponding challenge signal.

12. Reading apparatus as claimed in claim 10, further comprising a light modulator (16) arranged between the light source (13) and the identifier (2) when the information carrier is present inside the reading apparatus.

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13. Reading apparatus as claimed in claim 12, characterized in that said light modulator (16) contains an array of dark and bright pixels, wherein the array can be switched.

14. Reading apparatus as claimed in claim 12, further comprising a lens system (9, 11, 12) for widening the light beam (5), wherein the light modulator (16) is arranged in a widened section of the light beam (5).

- 5 15. Method for identifying an information carrier containing a non-clonable optical identifier (2) comprising an optical scattering medium (3) for being challenged by a light beam (5) and for scattering said light beam (5), and a light absorbing means (3, 4) for reducing the intensity of said light beam (5) so that an integration time for obtaining a response signal by integrating the light beam scattered (8) is extended, said method
- 10 comprising the steps of:
- challenging the optical identifier (2) of said information carrier (1) by a light beam (5),
 - detecting scattered light (8) scattered by the scattering medium (3) of said information carrier (1),
 - 15 - integrating said scattered light (8) over a period of time for obtaining a response signal, and
 - comparing the obtained response signal with a stored response signal associated with a corresponding challenge signal.
- 20 16. Non-clonable optical identifier (2), in particular for use in an information carrier as claimed in claim 1, comprising:
- an optical scattering medium (3) for being challenged by a light beam (5) and for scattering said light beam (5), and
 - a light absorbing means (3, 4) for reducing the intensity of said light beam (5)
- 25 so that an integration time for obtaining a response signal by integrating the light beam scattered (8) is extended.